Rural Settlement Types in Purba Bardhaman district of West Bengal: A Study at C.D. Block Level

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Abstract

The Purba Bardhaman district of West Bengal was newly formed on 7th April 2017. About 97.20% of the area and about 84.94% of the population belongs to rural settlements, respectively. So it can be called a rural district. In this study, the main focus is to recognize the rural settlements types and their distributional pattern. Also, mention the possible factors in the current distributional pattern of villages. The present classification of rural settlements is based on the dispersal index, which is as a ratio of the average population size and the spacing between settlement units. Based on the dispersal index, rural settlement of the district grouped into four types: (1) compact, (2) semi-compact, (3) semi-sprinkled, (4) sprinkled. In general, in a compact settlement, the average population size is very large and the spacing between settlements is very low, and the opposite situation is seen in the sprinkled settlement. But in the study area, the opposite situation of the general rule has been observed.

Keywords: Purba Bardhaman, Mauza, Rural Settlement, Dispersal Index

Introduction

In India, a rural unit or a village is known as mauza or mouza which has a definite administrative boundary and name for collecting revenue. Geographers consider rural settlement as man-made habitat on the rural landscape, based on primary occupations such as agriculture, forestry, mining, fishing, hunting, etc. which flourish on local resources (Mandal, 1979, p. 24; Mandal, 1989, pp. 9-10). Singh (Singh R. P., 1975, p. 269) also mentioned that "rural settlement is a relatively small and simple agglomeration of the houses at a favourable site, primarily associated with agriculture, which has influenced the formation of villages more than anything else".

Ahmad (1952) uses the term "types" at the local level in the classification of rural settlements in the sense that—"the characteristic groupings of rural dwellings in mauza" (Singh R. P., 1975, p. 281). But in a regional framework or a small scale map "the inter-settlement spacing and number of named settlement sites would help identify the types" (Singh R. Y., 1994).

A regional socio-economic development depends on the type of settlement there. Social, economic, and other services are easily accessible to people where the type of settlement is compact.

Literature Review

Various scholars of different countries have attempted the classification of rural settlements according to their sitting, size, functions, growth, etc. In 1931, for settlements classification, Bernhard devised concentration index as:

$$K = \frac{S \times M}{N^2}$$

Where, K = Index of concentration; S = Total number of houses; M = Area and N = Number of settlements. In 1950, Kant used a more precise formula for the concentration of settlements; as follows:

$$C = \frac{1}{M}\sqrt{\frac{A}{D}}$$

Where, C = relative interval between two settlements; $1/M$ = Map scale; A = Area; D = Density of habitations. There are some Indian scholars' viz. Ahmed, Singh R.L., Singh R.B., and Mandal R.B. — who have categorized the rural settlements. Among them, Singh R. B. (1975, p. 33) devised a new strategy based on the number of villages, hamlets, and the number of occupancy units; and categorized rural settlements into (1) compact, (2) semi-compact, (3) hamlet, and (4) scattered.

In 1972, Mandal R.B. used the ratio between population size of settlement units and their spacing for the measure of the dispersal of rural settlements. Mandal (1979; 1989) has been classified rural settlements into four types: (1) compact, (2) semi-compact, (3) semi-sprinkled, (4) sprinkled or dispersed.

Location and Extent of the Study Area

Purba Bardhaman district is situated in the eastern part of India or especially in south Bengal of West Bengal. The geographical extent of the district is $23^0 53'$ N in the north to $22^0 56'$ N in the south, and $88^0 25'$ E in the east to $87^0 56'$ E in the west. The district embraces an area of about 5432.69 Km^2. The district is bounded on three sides by rivers—on the east by Bhagirathi, on the north by Ajay, and the west by Damodar and Dwarkeshwar. Physiographically and climatically the district is located in the lower Gangetic plain and monsoon land,

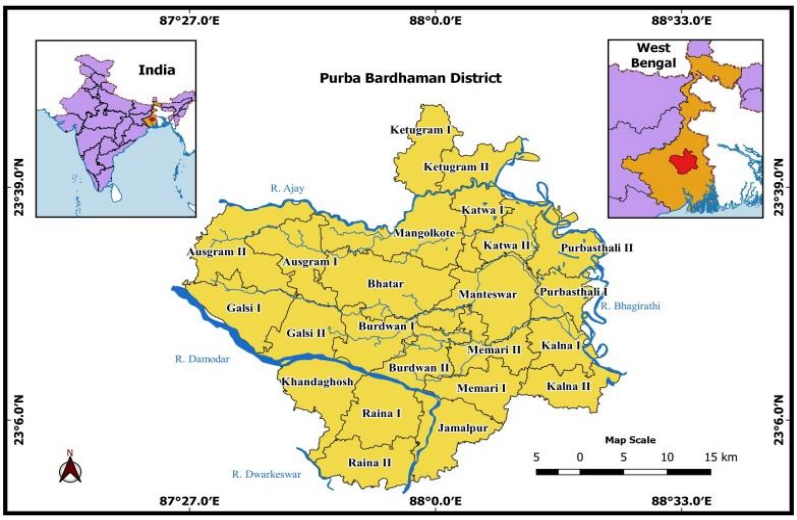

Figure 1 Location of the Study Area

respectively.

Methodology

Since the main purpose is to show the types of rural settlements and the distribution of dispersal index; therefore the urban units have been eliminated from the calculation of the dispersal index. Here, I have modified the dispersal formula of Mandal, 1979 as follows:

$$DI = \frac{\text{Average Population size of the Mauzas of the C. D. Block}}{\sqrt{\frac{\text{Total Area of the C. D Block}}{\text{Number of inhabited Mauzas in the C. D Block}}}} \quad \text{Equation 1}$$

Where, DI = dispersal index. Here, the DI shows the number of persons per kilometre. The average population size of the mauzas of the C.D. Block has been calculated by dividing the total rural population (excluding the population of urban units) by the number of inhabited mauzas in the C.D. Block. The total area of the C.D. Block is determined by the sum of all the mauzas (inhabited and uninhabited) but excluding the areas of urban units. All the above information is taken from the district census handbook of Bardhaman. The equal counts (quantile) module of classification of the QGIS 3.12 Bucuresti software has been used to show the distribution of the dispersal index on the district map.

Rural Settlement Types

The total number of mauzas in Purba Bardhaman is 2,165, and of which 2,102 are inhabited villages. According to 2011 census (District Census Handbook Barddhaman), the total population of the district is 48,35,532 and its rural population is 41,09,187 (84.98%). The average population size of a mauza in Purba Bardhaman is 1,955 as compared to West Bengal of 1,660, and the average spacing between rural settlements is 1.58 km as compared to West Bengal of 2.23 km. Out of 23 C.D. Blocks, the average mauza population of 12 blocks is lower than the average mauza population of the district. About 48.36% of the area and 57.56% of mauza (inhabited) of the district have an average population of below 2,000 (Table 1). Out of 23 C.D. Blocks, the average rural settlement spacing of 12 blocks is lower than the average settlement spacing 1.58 km of the district. In the district, about 38.09% of the area and 49.0% of mauza or rural settlements have average spacing below 1.50 km.

Table 1 Block wise Size, Spacing and Dispersal Index of Rural Settlement in Purba Bardhaman District on 2011

CD Block	Area in Km^2	Population	Inhabited Mouza	Population Size	Spacing in Km	Dispersal Index	Settlement Type
Ausgram I	222.332	119363	102	1170	1.48	793	Sprinkled
Ausgram II	360.455	150896	58	2602	2.49	1044	Sprinkled
Bhatar	415.013	263064	104	2529	2.00	1266	Semi Compact
Burdwan I	226.162	175836	75	2344	1.74	1350	Semi Compact
Burdwan II	185.769	146592	83	1766	1.50	1181	Semi Sprinkled
Galsi I	245.238	164467	85	1935	1.70	1139	Sprinkled
Galsi II	219.096	147177	73	2016	1.73	1164	Semi

							Sprinkled
Jamalpur	263.026	266338	121	2201	1.47	1493	Compact
Kalna I	162.316	186138	98	1899	1.29	1476	Compact
Kalna II	169.745	157235	112	1404	1.23	1140	Semi Sprinkled
Katwa I	167.904	166614	63	2645	1.63	1620	Compact
Katwa II	163.238	136708	63	2170	1.61	1348	Semi Compact
Ketugram I	193.965	165408	62	2668	1.77	1508	Compact
Ketugram II	160.03	118567	55	2156	1.71	1264	Semi Compact
Khandaghosh	265.235	189336	107	1769	1.57	1124	Sprinkled
Mangolkote	365.43	263240	130	2025	1.68	1208	Semi Sprinkled
Memari I	185.076	214005	111	1928	1.29	1493	Compact
Memari II	188.642	150252	88	1707	1.46	1166	Semi Sprinkled
Manteswar	305.197	237398	136	1746	1.50	1165	Semi Sprinkled
Purbasthali I	136.663	153703	91	1689	1.23	1378	Semi Compact
Purbasthali II	192.47	212355	88	2413	1.48	1632	Compact
Raina I	260.382	173094	110	1574	1.54	1032	Sprinkled
Raina II	227.285	151401	87	1740	1.62	1077	Sprinkled

Source: Calculated by the author from District Census Handbook of Barddhaman 2011

Dispersion Index

Based on the dispersal index (Equation 1), rural settlements of Purba Bardhaman district can be classified into four major types. These are as follows:

1. Compact

The compact rural settlements have developed in the eastern part of the district. About 1,164.757 km2 (22.06%) of the area of the district has compact rural settlements. The compact rural settlements have sprung up in Ketugram I, Katwa I, Purbasthali II, Kalna I, Memari I, and Jamalpur C.D. Blocks (Table 1). In all these C.D. Blocks of the district, the dispersal index ranges between 1,427—1,632 persons/km. In this group highest dispersal index can be seen in Purbasthali II (1,632).

This part of the district is easily irrigated by rivers or canals and has very fertile soil which is formed by the rivers of Bhagirathi, Ajay, Brahmani, Behula, Banka, and Khari. Some areas of Ketugram II C.D. blocks are less flood-prone; therefore they are the best example of a dry-point settlement. It has an improved transport network by railways and highways, viz. Howrah to Katwa-Azimganj, Bardhaman to Howrah, Bardhaman to Katwa and highways are viz. NH-116A, SH-6, SH-14, NH-2, SH-19, SH-15, SH-8 both connected this region with the entire district and the state (Figure 7).

2. Semi-Compact

This type of settlement can be seen in the middle and eastern parts of the district. About 1,101.106 km2 (20.85%) of the area of the district has semi-compact rural settlements. Compared to other types of settlements in the district, this type of settlement has developed over a very small area. Purbasthali I, Katwa II, Burdwan I, Bhater, and Ketugram II C.D. Blocks are included in this category. In all these C.D. Blocks of the district, the dispersal index ranges between 1,208—1,427 persona/km.

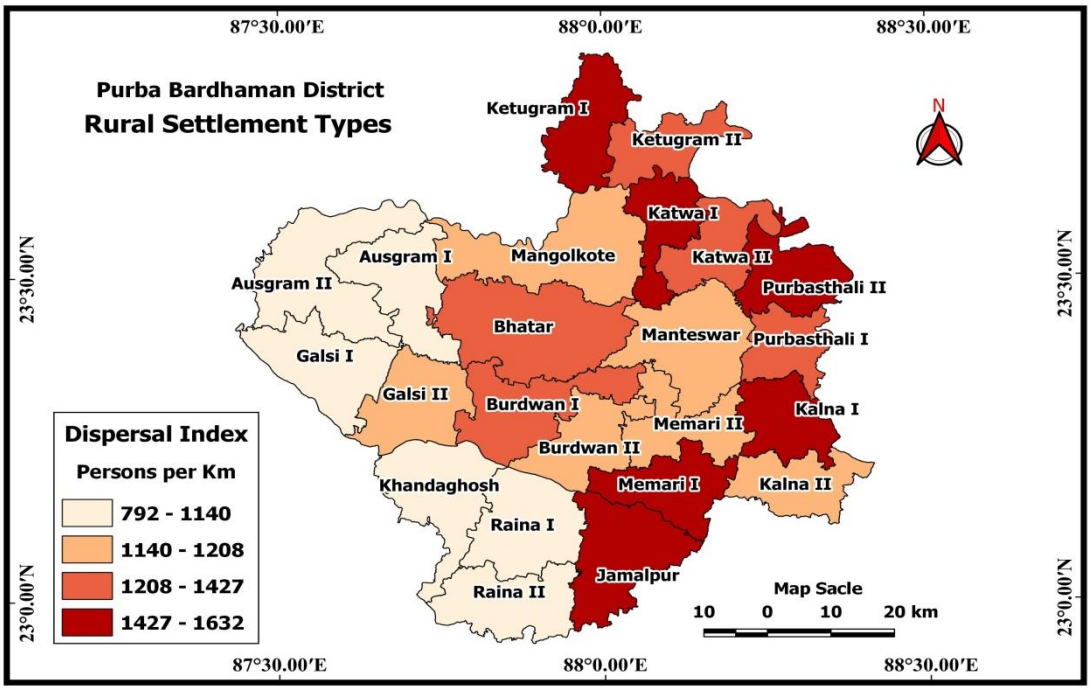

Figure 2 Rural Settlement Types of Purba Bardhaman

Since such settlements have developed around compact settlements except for Bhatar and Burdwan I, it can be said that fertile soil, irrigation facilities, transportation system, etc. are almost as developed as compact settlements (Figure 2).

3. Semi-Sprinkled

Kalna II, Galsi II, Manteswar, Memari II, Burdwan II, and Mangolkote C.D. Blocks are included in this category. After the sprinkled rural settlement, such type of settlement has occupied the largest area, about 1,433.879 km^2 (27.15%) of the area of the district has been developed semi-sprinkled rural settlements. In all these C.D. Blocks of the district, the dispersal index is ranges between 1,140—1,208 persona/km.

The severity of floods, low-lying agricultural lands, comparatively elevated barren land, and soil erosion, etc. are the reason for the development of such type of settlement.

4. Sprinkled

The sprinkled settlements are found in the north-western and south-western parts of the district. Such type of settlement has occupied the largest area of the district, about 1,580.927 km^2 (29.94%) of the total rural areas are included. Ausgram I, Raina I, Ausgram II, Raina II, Khandaghosh and Galsi I C.D. Blocks are included in this category. Here dispersal index ranges from 792—1,140 persona/km. Ausgram I C.D. Block has the lowest dispersal index 793 persons/km in the district (Table 1).

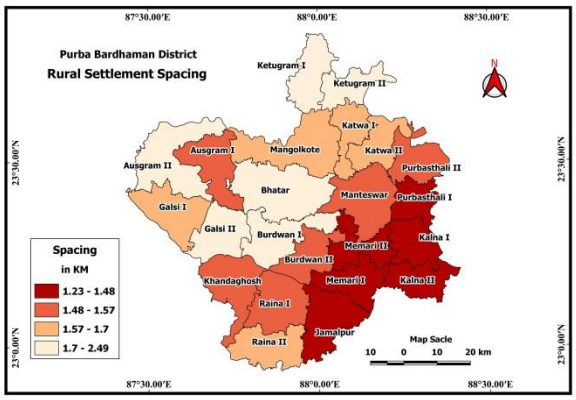

Figure 3 Spacing between settlements

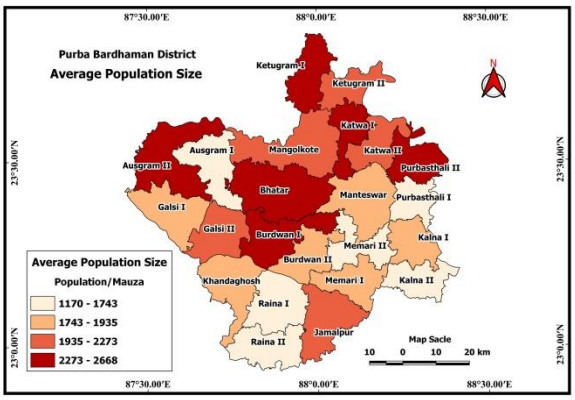

Figure 4 Average Population Size

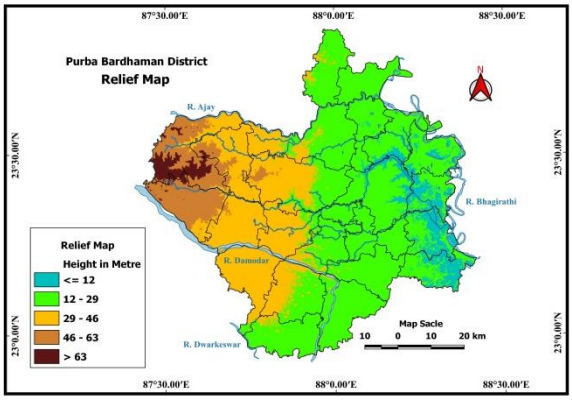

Figure 5 Relief Map

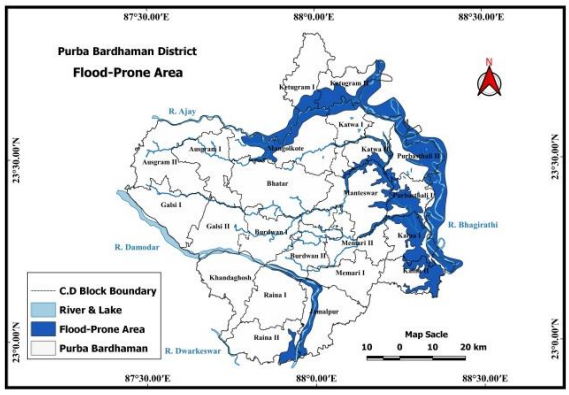

Figure 6 Flood-prone Area

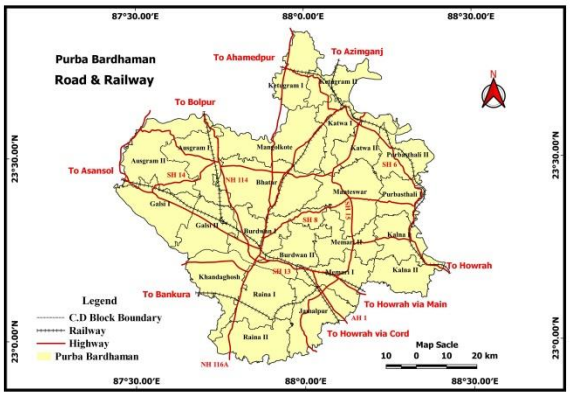

Figure 7 Rail and Road network

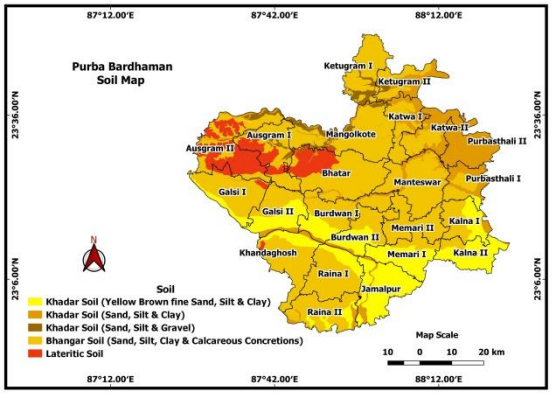
Purba Bardhaman
Soil Map
Soil
Khadar Soil (Yellow Brown fine Sand, Silt & Clay)
Khadar Soil (Sand, Silt & Clay)
Khadar Soil (Sand, Silt & Gravel)
Bhangar Soil (Sand, Silt, Clay & Calcareous Concretions)
Lateritic Soil
Map Scale
10 0 10 20 km

Figure 8 Soil map

The sprinkled settlements have been developed here due to raised and rugged topography, barren and erosion-prone soils, the presence of forested areas, and a few flood-prone areas near the Ajay River, etc. It is the highest elevated area of the district and its height is between 28 to 75 metres from the mean sea level. Relatively some waterlogged and flood-prone area, barren and erosion-prone less fertile lateritic soils of Lalgarh formation are found in most of the western parts of the district, which causes a number of problems in agriculture here (Figure 8).

Conclusion

The main rural settlement type of the Purba Bardhaman district is sprinkled and is followed by semi-sprinkled rural settlements. These two types of settlements cover about 57.09% of areas and are most widespread in the northwest and southwest parts of the district. On the other hand, compact and semi-compact rural settlements have developed in the northeast and southeast parts of the district.

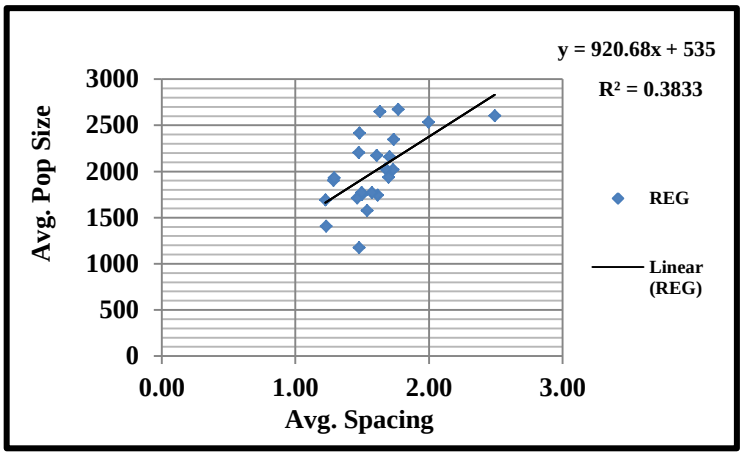

Figure 9 the relationship between Avg. Pop Size and Spacing

In the present study area, the opposite situation of the general rule has been observed. That is, with the increasing in the average population size, the average spacing between settlements has increased (Figure 9).

The role of both natural and culture factors is very important in developing the distributional pattern of different types of rural settlements in the district. At present, however, various cultural issues such as roads, railways, proximity to city, livelihood, education, medical facilities, etc. are affecting the distribution of settlements. Since the major occupation of the district is agriculture, so the impact of soil can be seen in the distribution of settlements. In addition, the presence of rivers has played a dual role. In some places, it has acted as a centrifugal force due to excessive flooding, and in some places, it has acted as a centripetal force to provide additional facilities of irrigation.

However, as the number of farmers has been declining for decades, it can be said that in the future socio-economic factors will dominate the distribution of rural settlements.

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